Appendix C: Motorized Mixed Use Analysis

Appendix C consists of two documents:

Public Uses (Roads) White Paper

This is a paper on public road use on the Klamath National Forest. This paper focuses on two topics:

Forest road management and maintenance strategies to meet public and Forest Service access and resource protection needs using limited funding sources.

The impact of adding unauthorized roads under the Travel Management Rule.

Engineering Analysis of Motorized Mixed Use on National Forest System Roads

This is an engineering analysis of motorized mixed use on national forest roads on the Klamath National Forest which has three parts:

- A summary of relevant laws and regulations; a history of transportation management on the Forest; and a methodology for the mixed use analysis.
- A description of the roads analyzed, by ranger district.
- A compilation of the road-by-road analyses (included in the project files).

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USDA Forest Service
Klamath National Forest

Public Uses (Roads) White Paper
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TOPIC

- Forest road management and maintenance strategies to meet public and Forest Service access and resource protection needs using limited funding sources.

- Impact of adding unauthorized roads under the Travel Management Rule

INTRODUCTION

The definition of a forest road is "Any road wholly or partially within, or adjacent to, and serving the National Forest System and which is necessary for the protection, administration, and utilization of the National Forest System is a "Forest Road" (Title 23, Section 101 of the United States Code). The Klamath National Forest (NF) road network facilitates forest management, provides access to diverse recreational opportunities, and contributes to the rural transportation infrastructure of interspersed private lands. At the same time, agency and public awareness of the environmental costs and risks associated with forest roads and attendant activities is increasing. As the agency's emphasis has shifted from commodity production to ecosystem health, the forest road system needs to be analyzed, managed and maintained to minimize environmental impacts and reduce costs, while providing sufficient access for public and agency needs. This paper will provide background information and management strategies being employed to meet these objectives.

KLAMATH NATIONAL FOREST ROAD SYSTEM

State and county roads stretch across the Klamath NF and serve large tracts of federal land. Some of these county roads are also designated as Forest Highways, making them eligible under the Federal Lands Highway Program for disaster relief and major renovation funds. Examples are the Scott River Road, Sawyers Bar Road and Indian Creek Road. The Forest facilitates management of these roads, but jurisdiction for their repair and maintenance lies with State and county road agencies. Klamath National Forest System (NFS) Roads, under Forest Service jurisdiction, branch off from these state and county roads as arterial, collector and local roads.

National Forest System (NFS) roads are not public roads in the same sense as roads that are under the jurisdiction of State and county road agencies. NFS roads are not intended to meet the transportation needs of the public at large. Instead, they are authorized only for the use and administration of national forest lands. Although generally open and available for public use, that use is at the discretion of the Secretary of Agriculture. Through authorities delegated by the

Secretary, the Forest Service may restrict or control traffic to meet specific management direction.

NFS roads are categorized using the following system:

Maintenance Level (ML) 5: Roads that provide a high degree of user comfort and convenience. Normally double lane paved facilities, or aggregate surface with dust abatement. This is the highest standard of maintenance.

Maintenance Level 4: Roads that provide a moderate degree of user comfort and convenience at moderate speeds. Most are double lane aggregate surfaced. Some may be single lane. Some may be chip sealed or dust abated.

Maintenance Level 3: Roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. Typically these roads are low speed, single lane with turnouts and native or aggregate surfacing.

Maintenance Level 2: Roads open for use by high-clearance vehicles. Passenger car traffic is allowed but discouraged. Use by the public is unrestricted, and is generally focused on access to privately-owned lands or recreation sites, or permitted activities (grazing, woodcutting, etc.). The Forest Service uses these roads extensively for administrative purposes. Non-traffic generated maintenance is minimal.

Maintenance Level 1: These roads are closed year-round, but some intermittent use may be authorized. When closed, they must be physically closed with barricades, berms, gates, or other closure devices. When closed to vehicular traffic, they may be suitable and used for non-motorized uses, with custodial maintenance.

The current Klamath NF transportation system encompasses 4,536 miles of roads in all maintenance levels (Table 1). The Ukonom District and its 357 mile road system are included; however, management of these roads is the responsibility of the Six Rivers National Forest.

Table 1. Road Mileage on the Klamath National Forest by Maintenance Level.

Maintenance Level	Miles
Level 1	826.5
Level 2	2760.9
Level 3	805.1
Level 4	102.6
Level 5	41.5
Total Miles:	**4536.6**

ROAD MAINTENANCE TERMINOLOGY

Maintenance needs on NFS roads are categorized and quantified in several ways that must be understood to make sense of cost data and projected annual and deferred maintenance needs being reported at the national level. Common terms used in this paper are defined here.

Traffic Generated & Non-Traffic Generated Maintenance: Traffic generated maintenance needs are those associated with the use of a road, such as rutting of the roadbed caused by traffic during wet weather. In general, as use on a particular route increases, so does the traffic-generated maintenance needs. Non-Traffic generated maintenance is independent of the use of a road. For example, the growth of tree limbs and brush creates a maintenance need, but the growth is independent of the volume of traffic the road receives.

Annual Maintenance: This term refers to the expected annual maintenance required on roadways and roadsides based on the Maintenance Level assigned to the road. The actual amount of maintenance required depends on the amount of use the road has received, the condition of the surface, and the season of use. Annual maintenance estimates include many work items that are not done yearly, but are annualized. For example, the aggregate surfacing on a mile of level 3 road may last 25 years and cost $60,000 to replace. This equates to a simple annualized cost of $2,400 per mile.

Deferred Maintenance: This is work that can be deferred, without loss of road serviceability, until such time as the work can be economically or efficiently performed. Using the example above, if the surfacing is completely worn down, the deferred maintenance is $60,000 per mile for replacement. Deferred maintenance needs can be reduced through a number of different actions and strategies, as discussed below.

Safety & User Related Maintenance: This term refers to activities that protect the public and agency employees and allow use of the road for the intended purpose. Examples include installation of warning devices (such as stop or bridge abutment signs); pothole patching on a level 5 road; maintaining surface and brush clearance for passenger car access to developed recreation sites; maintaining access for fire suppression initial attack equipment; or maintaining access for forest health project planning and implementation.

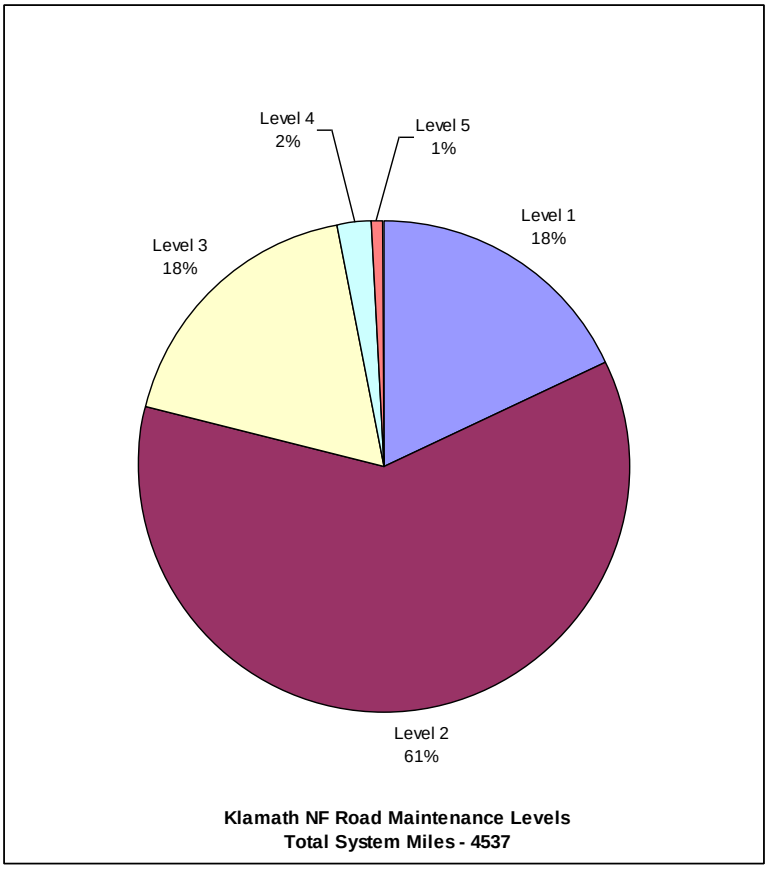
Resource Protection Related Maintenance: These activities preserve the road prism for its intended use and minimize erosion and sediment delivery to aquatic systems. Examples include ditch and culvert cleaning; maintaining rolling dips to prevent stream diversion; or surface blading to remove wheel ruts that concentrate runoff.

Stormproofing & Aquatic Passage: These projects reconstruct a road using various techniques to minimize chronic and storm related resource damage, reduce future maintenance costs, and restore aquatic passage at stream crossings. Stormproofing includes out-sloping the road surface to the maximum extent possible and eliminating associated inboard ditches and cross drains; installing larger culverts and/or lowering the grade through stream crossings to reduce fill

volume and prevent diversion; installing rolling dips on moderate road grades to minimize road surface erosion; armoring fills with rock to reduce erosion should they be overtopped; or completely replacing earth fills with rock. Aquatic passage involves replacing a pipe culvert with an open bottom culvert or bridge to restore the natural stream bottom.

DEFERRED MAINTENANCE BACKLOG

The Klamath National Forest's transportation system has developed over the past 100 years, generally in response to public access and resource extraction needs. The current inventory shows over 4,500 miles of road, with 79% in ML's 1 and 2, and only 21% in ML's 3, 4 and 5 (Figure 1). Road maintenance budgets have declined over the past decade, and the Forest's internal capability to maintain roads has been reduced with loss of maintenance personnel and equipment. The Klamath Forestwide Roads Analysis completed in 2002 reported a Klamath NF deferred maintenance backlog of $55.5 million and the need for an annual maintenance budget of $6.1 million to cover all ML 1 – 5 roads on the system. Fiscal year 2007 figures are $47.9 million and $10.2 million respectively.



These national estimates require some explanation. The deferred and annual maintenance figures were generated using a national formula based on random sampling (less than 0.2% miles of system roads nationwide for 2009) and standard maintenance prescriptions. It is a useful tool for tracking national trends and producing auditable outputs, but was never intended for use at the forest level, nor is it considered to be statistically valid at this scale. The 2007 deferred

maintenance cost figures for ML 4 and 5 roads ($4.1 million) is a reasonably fair assessment of needs, since paved or chip sealed roads have clearly defined maintenance needs to preserve the surfacing and avoid rapid failure. Annual maintenance cost figures (3.1 million) for ML 4 and 5 roads are too high for the Klamath due to lighter traffic volumes and winter snow cover extending the pavement life. Local estimates are closer to $2 million. Maintenance level 2 and 3 road maintenance costs are even more overstated. These roads account for $42 million (88%) of the 2007 deferred maintenance and $6.7 million (66%) of the annual maintenance needs; however these require far less maintenance expenditures to remain useable and protect natural resources. The nationally calculated cost figures for ML 2 and 3 roads are based on several assumptions:

- High cost aggregate surfacing should be replaced and maintained on most level 3 roads
- Culverts have fixed and relatively limited life spans
- ML 2 roads require high numbers of cross drain culverts
- Roadside vegetation and debris should be regularly removed from every road

These assumptions are not site-specific to the Klamath NF, and do not apply to many of the Forest's roads. Given the conditions on the ground and current maintenance and environmental objectives, the maintenance figures for ML 2 and 3 roads are considered to be unreasonably high, which artificially inflates the Forest deferred backlog figure. More reasonable figures for the entire Klamath ML 1 through ML 5 road system would be in the range of $20 million deferred maintenance and $3 million annual maintenance. While these figures may still appear high, they are slowly being reduced through a variety of activities that are part of a Forest-wide strategy.

FOREST STRATEGY FOR ROAD MAINTENANCE

Klamath NF line officers regularly make decisions about which roads to maintain or improve, and to what standard, in order to protect resources and minimize costs. These maintenance decisions, coupled with road projects such as stormproofing, fish passage construction, and decommissioning, reduce road maintenance needs and the deferred maintenance backlog. These actions are accomplished through carefully targeted maintenance planning, and aggressive pursuit of funding opportunities. The Forest has requested and received significant additional funding from several sources for road restoration and design projects since 2006. The ongoing decommissioning program has resulted in a net loss of road miles over the past decade. These actions have reduced annual road maintenance needs, allowing more regular maintenance funds to be focused on the deferred maintenance backlog.

Annual Maintenance

Road managers consider a number of factors in deciding when, where and on what to spend annual maintenance funds. Every road does not need or receive maintenance every year, nor is every type of maintenance task completed when a road is maintained. There is no expectation, either by Forest managers or the public that every mile of every Forest road will be passable every year. A description of the Klamath NF transportation system by maintenance level follows.

Maintenance Level 5: These roads are mostly double lane paved that do require care every year and significant mission and safety related maintenance every 8 – 10 years. Important to note is these roads only make up 1% of the system. An example is the 9 mile segment called Grayback located between county roads connecting Happy Camp on Highway 96 to O'Brien on Highway 199 in Oregon. These roads receive relatively low traffic volumes with significantly fewer log trucks than in years past, and most are not driven in winter due to snow cover. This substantially reduces maintenance costs as heavy vehicles and winter use greatly accelerate asphalt deterioration, and generate increases in safety related costs. By the end of 2009, we will have completed major maintenance on more than 23 of 41 miles of level 5 roads by completing full depth asphalt patching of bad areas, crack sealing and then double chip sealing with a fog seal. Another 6 miles may receive the same treatment if special funding materializes. This will extend the pavement life for another 10 years. The remaining 12 miles are in fair to good condition. Drainage is fully maintained and sediment run-off is negligible on these roads.

Maintenance Level 4: These are mostly chipsealed roads with some asphalt sections that also require annual care and significant mission and safety related maintenance every 8 – 10 years. These roads make up 2% of the system. They generally service campgrounds, major trailheads, river accesses and administrative sites. These roads receive low traffic volumes and most are not driven in winter due to facility seasonal closures and snow cover. The vast majority of these roads have received the critical maintenance necessary to preserve the surfacing. Examples include recent chipseals at Tree of Heaven, Juanita Lake and Indian Scotty campgrounds and asphalt overlays at several administrative sites. Drainage is fully maintained and sediment run-off is negligible.

Maintenance Level 3: These roads make up 18% of the system and 88% are in-sloped to a ditch, which reduces the probability that water will concentrate on the road and erode the surface. Most of these roads were aggregate surfaced at one time, but the rock has worn off and been pounded into the native material. In many cases, the aggregate surfacing was placed for the purpose of withstanding heavy use during logging operations. Since the mid 1990's, the traffic mix has shifted to predominately light administrative use and dispersed recreation. The maintenance objectives have shifted to drainage structure cleaning, debris removal, hazard tree removal and spot roadside brushing for safety. The road surfaces are generally hard, stable and bumpy, but are passable with most passenger cars having reasonable ground clearance. The majority of traffic on these roads is pickup trucks or sport utility vehicles, which offer even better ground clearance. These roads are graded only as necessary for proper drainage or for safety concerns such as severe wash boarding. This not only saves maintenance funds, but reduces fresh ground disturbance and reduces surface disturbance and the potential for sediment generation. We only plan to replace aggregate surfacing where needed for resource protection. From a road user perspective, the trip may take a little longer, but given the winding roads, steep drop offs, extremely light traffic volumes and beautiful country, this is probably a good thing.

The following summarizes the maintenance level 3 strategy and cost savings:

- **Aggregate Surfacing** – Applied only as needed for resource protection adjacent to major streams or in soft soils or for driver safety. Approximately 200 miles of road could be

enhanced through the replenishment of aggregate surfacing, but since there are no associated resource problems, the decision has been made to forgo surfacing at this time.

- **Grading/Ditch Cleaning** – Conducted as needed to restore surface drainage or abate safety hazards. In many areas where the surface is hard and stable, the roadbed would need to be ripped in order to loosen enough soil to grade a smooth running surface. This ground disturbance could lead to an increase in sediment run-off until the road surface stabilizes, so roads with stable surfaces are generally not graded.

- **Culverts** – Check and clean as needed, with scheduled replacement of those that are deteriorated or of inadequate size. National standard for replacement life is 20 years; however, inspections indicate that most culverts on the Klamath are 30 – 40 years old and still in good condition. Changing culvert lifespan directly affects calculated deferred maintenance costs.

- **Debris Removal** – Accomplished as required on all ML 4 – 5 and most ML 3 roads, but generally only as needed for specific projects on ML 2 roads. As an example, in fiscal year 2008 only 686 miles of ML 2 roads received maintenance.

- **Roadside Brushing** – Brushing needs depend on vegetation types and precipitation which decreases substantially from west to east across the Forest. The western-most roads on the Klamath NF with lower growing vegetation generally have higher brushing costs. Brushing is focused on areas with safety concerns (generally sight distance around curves). Force account crews assist with spot brushing, which is less expensive and more flexible than using contract crews.

Maintenance Level 2: These roads make up 61% of the system. Eighteen percent are in-sloped to a ditch; the remaining 82% are either out-sloped or flat. The majority of these roads are only maintained as needed to support Forest projects or provide access to lookouts or recreation facilities; therefore, many may not see any maintenance for several years. In some cases, roads may become impassable due to rocks or down trees. When needed, maintenance activities typically consist of debris removal and roadside brushing. The amount of brushing required can be substantial, depending on location and the last time it was done. Spot aggregate surfacing is only used to stabilize soft areas. By designing a maintenance scheme focused on roads needed specifically for project or recreation access, we can effectively utilize our maintenance budget on the highest-priority needs.

Maintenance Level 1: These roads make up 18% of the system and only 3% are in-sloped to a ditch. Nearly half of the in-sloped roads are located on the Goosenest District where rainfall is low and the volcanic soil is porous. Normal practice is to place these roads into self-maintaining hydrologic storage using a combination of water bars, rolling dips and pulling culverts. Closure device is either a gate or berm. No maintenance is typically performed except to check the closure device.

Change in Operational Maintenance Level

When roads no longer warrant or receive the type of use for which they were designed, the road manager may recommend that the road's maintenance level be reduced. For example, in many cases on the Forest, ML 3 roads support little traffic, and may be subject to rocks, woody debris, encroaching vegetation and uneven surfaces. Over the past decade a number of ML 3 roads have been reduced to ML 2, and drainage function (rather than passenger comfort) has become the primary objective. These roads are then prioritized for maintenance with the rest of the ML 2 roads. Annual maintenance needs are reduced, and the dollar values assigned to these roads as part of the deferred maintenance backlog are also reduced.

Stormproofing, Decommissioning & Aquatic Passage

Stormproofing opportunities are evaluated at the watershed level on typically maintenance level 1 through 3 roads, to reduce the need for drainage maintenance and to prevent catastrophic soil loss during significant storm events. Approximately 117 miles of roads in the South Fork Salmon, Grider Creek and Elk Creek have been stormproofed using grants and/or special funding sources. Stormproofing project design plans are underway in the Indian Creek drainage and funds are being sought to start project designs in North Fork Salmon River and Lower Scott River watersheds.

Decommissioning is analyzed at the watershed level through the appropriate project-level environmental documentation. It may be as simple as taking a naturally revegetated road with no erosion issues off the system, or it may involve major reconstruction to remove culverts and fills, followed by aggressive outsloping to restore the original hillside contour to the extent possible. Deferred and annual maintenance costs are removed from the transportation system corporate database (INFRA) for all decommissioned roads. Over the past decade, the Klamath NF has decommissioned 167 miles of NFS roads and 75 miles of unauthorized roads, either uneeded roads or those that were causing or could potentially cause resource damage.

Aquatic passage projects have been completed on approximately 23 stream crossings, with a few more under construction or waiting for funding. The projects typically replace a culvert with an open bottom arch or a bridge that greatly reduces the fill volume in the stream and exceeds the 100 year storm flow. These projects do more than enhance aquatic habitat – they reduce the potential for culvert blockage and subsequent heavy sedimentation from loss of fill. In some cases, the old culvert was near the end of its useful life, so the replacement structure reduces future maintenance needs.

ADDING ROADS TO THE SYSTEM

A logical question when proposing to add new roads to the transportation system is that of affordability. The ongoing efforts described in this paper are aimed at providing a sustainable transportation system to meet a range of access needs and protect natural resources. The unauthorized roads being proposed for addition to the system under the Travel Management FEIS have for years provided access to dispersed recreation opportunities, and connections between NFS roads. These routes have not needed nor received Forest Service maintenance, due

in large measure to being mostly short lengths located over generally gentle slopes with no erosion potential. On-the-ground review of these routes indicates that we would not consider conducting maintenance for user access. Expected additional management costs are (1) installation of road signs at less than $100 each and (2) entry of data into the corporate INFRA database.

SUMMARY

- Management of the Forest road system has changed from an emphasis on commodity extraction to resource protection.
- The Klamath NF is working towards the minimum road system to meet agency and public uses.
- National maintenance cost models were not intended to be used at the Forest level
- The Forest road management program is focused on safety and resource protection while aggressively seeking to leverage maintenance funds through grants and special programs.
- Strategies to reduce annual maintenance costs include:
    - Prioritizing maintenance of ML 2 roads on project and recreation-related access needs;
    - Downgrading maintenance levels where possible without compromising user needs or resource protection; and
    - Focusing on watershed level stormproofing and decommissioning to enhance resource protection and reduce future maintenance needs.
- Proposed road additions under the Travel Management FEIS will have minimal impact on road maintenance program.

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Engineering Analysis

of

Motorized Mixed Use

on

National Forest System Roads

Klamath National Forest

April 2009

Prepared in Consultation With
Lampe Engineering

Table of Contents

Introduction

Engineering analysis, or traffic engineering, is the science of measuring traffic and travel, the study of the basic laws relating to traffic flow and generation, and the application of this knowledge to the professional practice of planning, designing and operating traffic systems to achieve safe and efficient movement of persons and goods. (Ref. 1)

Motorized mixed use, as defined by the US Forest Service (FS), is the designation of a National Forest System (NFS) road for use by both highway-legal and non-highway-legal motor vehicles. Examples of highway legal motor vehicles are: passenger cars, sport utility vehicles, pickups, motor homes, buses, motorcycles, dual-sport motorcycles and commercial trucks. Examples of non-highway-legal (OHV) motor vehicles are: dual-sport motorcycle, enduro motorcycle, motocross motorcycle, trails motorcycle (dirt bikes), sport ATV (all-terrain vehicle), utility ATV (quad) long-wheel base 4WD, short wheel base 4WD, rock crawler, dunebuggy/sandrail, utility type vehicle(UTV) and snowmobiles.

The FS maintains NFS roads for prudent drivers in standard passenger cars (buses and motor homes) or for high-clearance traffic, i.e., all the others listed above. (FSH 7709.59–25.21 & 25.22 2/09)

Further, the FS defines five (5) levels of maintenance to be applied to all NFS roads (FSH 7709.59 62.32 (2/09)

Level 1	Closed to motor vehicle use.
Level 2	High clearance vehicle use.
Level 3	Standard passenger car use with comfort and convenience not a priority. Typically low speed with single lane and turnouts.
Level 4	Passenger car with moderate degree of user comfort and convenience at moderate travel speeds. Most are 2 lane and aggregate running surface.
Level 5	Passenger cars with high degree of user comfort and convenience. Normally 2 lane and paved.

The objective of this analysis is to assess the current operating conditions on the identified miles of maintenance level (ML) 3 & 4 unpaved NFS roads to address the many factors related to motorized mixed use as outlined in EM-7700-30 (12/05).

OHV use is not being proposed on paved (asphalt or chip sealed) NFS roads except on two ML 4 roads.

The first task is to review, understand and apply the FS regulations, directives and state laws.

Forest Service Manual (FSM) Forest Service Handbook (FSH) and State Vehicle Code Laws

EM-7700-30 (12/05)–Guidelines for Engineering Analysis of Motorized Mixed Use on National Forest System Roads is the basic road map for conducting this analysis.

FSM 7700 (1/09) Zero Code, Chapter 10 Travel Planning, Chapter 30 Road Operations and Maintenance, FSH 7709.55 (1/09) Chapter 10 Travel Planning for Designations, Chapter 30 Engineering Analysis and FSH 7709.59 (2/09) Chapters 10-60 Road System Operations and Maintenance Handbook, all dovetail with EM-7700-30(12/05).

The California State Vehicle Code (CVC) and Oregon Revised Statutes (ORS) are the major sources of State law pertaining to traffic engineering and are referred to in both the FSM and FSH. Relevant sections of the CVC and ORS are covered below; however the vast majority of the Forest is located in California and the Forest Service Pacific Southwest motorized mixed use guidance is written around the CVC.

CVC Provisions:

There are several CVC Divisions that apply to operator license/certificates, vehicle registration, vehicle equipment and training. The key sections are listed in the Appendix 1 – CVC. For example, Division 16.5, Chapter 7–OHV Safety, Education and Certificates provides specific requirements for operators under the age of 18 years.

And there are three sections in Chapter 1 of Division 16.5 that are causing a lot of confusion and concern. The following is from the on-line CVC:

Applicability of Provisions

38001. (a) Except as otherwise provided, this division applies to off-highway motor vehicles, as defined in Section 38006, on lands, other than a highway, that are open and accessible to the public, including any land acquired, developed, operated, or maintained, in whole or in part, with money from the Off-Highway Vehicle Trust Fund, except private lands under the immediate control of the owner or his or her agent where permission is required and has been granted to operate a motor vehicle. For purposes of this division, the term “highway” does not include fire trails, logging roads, service roads **regardless of surface composition**, or other roughly graded trails and roads upon which vehicular travel by the public is permitted.

Amended Sec. 37, Ch. 563, Stats. 2002. Effective January 1, 2003.

Operation on Highway

38025. In accordance with subdivision (c) of Section 4000, a motor vehicle issued a plate or device pursuant to Section 38160 may be operated or driven upon a highway but only as follows:

(a) On a two-lane highway, only to cross the highway at an angle of approximately 90 degrees to the direction of the roadway and at a place where a quick and safe crossing may be made or only when the roadway is not maintained by snow removal equipment

and is closed to motor vehicles ***that*** are subject to registration pursuant to Division 3 (commencing with Section 4000), or only to cross a highway in the manner specified in subdivision (b).

Designating Highways: Combined Use

38026. (a) In addition to Section 38025 and after complying with subdivision (c) of this section, if a local authority, an agency of the federal government, or the Director of Parks and Recreation finds that a highway, or a portion thereof, under the jurisdiction of the authority, agency, or the director, as the case may be, is located in a manner that provides a connecting link between off-highway motor vehicle trail segments, between an off-highway motor vehicle recreational use area and necessary service facilities, or between lodging facilities and an off-highway motor vehicle recreational facility and if it is found that the highway is designed and constructed so as to safely permit the use of regular vehicular traffic and also the driving of off-highway motor vehicles on that highway, the local authority, by resolution or ordinance, agency of the federal government, or the Director of Parks and Recreation, as the case may be, may designate that highway, or portion thereof, for combined use and shall prescribe rules and regulations therefore. No highway, or portion thereof, shall be so designated for a distance of more than three miles. No freeway shall be designated under this section.

Amended Sect. 39, Ch. 563, Stats. 2002. Effective January 1, 2003

ORS Provisions:

Oregon Revised Statutes (ORS) regulates the use of motor vehicles in Oregon, including motor vehicles used on the national forests. Per ORS 821.190, it is unlawful to operate a Class III vehicle on a highway, but exemptions are established in 821.200. One of these exemptions is “(2) a snowmobile or all-terrain vehicle may be lawfully operated upon a highway under any of the following circumstances…(c) Where the highway is posted to permit snowmobiles or all-terrain vehicles. ORS 821.200 states “The prohibitions and penalties under ORS 821.190 do not apply when a snowmobile or all-terrain vehicle that qualifies for the exemption from equipment requirements under ORS 821.010…”

The exemption noted above is described in ORS 821.020:

Applicability of off-road vehicle exemption from general equipment requirements.

(1) This section establishes the areas where the exemption from equipment requirements for off-road vehicles described under ORS 821.010 is applicable. The exemption applies to any land, road or place within the State of Oregon that meets the

description in subsection (2) of this section and that is not posted as closed to off-road use.

(2) The exemption applies to each of the following lands, roads and places:

(a) Lands that are open to the public.

(b) Roads, other than two-lane gravel roads, that are open to the public.

(c) Paved parking lots adjacent to or on designated off-road vehicle areas, trails and routes that are open to the public.

(d) Any local two-lane gravel road that is open to the public and that is designated by the road authority with jurisdiction over the road as open to off-road vehicles that are described in ORS 821.010. [1983 c.338 §711; 1999 c.565 §4]

The use of the term “highway” appears in the following FSM’s and FSH:

FSM 7703.3(1/09) – Jurisdiction Over Forest Transportation Facilities. 2. Transfer of Jurisdiction Over a Forest Transportation Facility. Wherever possible, transfer jurisdiction over NFS roads and associated forest transportation facilities to the appropriate public road authority when the road meets <u>any</u> of the following criteria:

a. More than half the traffic on the road is not related to administration and use of NFS lands.

b. The road is necessary for mail, school, or other essential local government purposes.

c. The road serves yearlong residents within or adjacent to NFS lands.

FSM 7740.5 (8/2000). Forest Highway. A designated forest road under the jurisdiction of, and maintained by, a public authority that is subject to the Highway Safety Act.

FSM 7741.1 – Route Designation. Forest highways are a special classification of forest roads. They are specifically designated state or local government roads that meet the criteria listed in 23.CFR 660.105. The designation of forest highways is not intended to form a “system” of roads. Instead, the purpose of the designation is to identify state and local government roads that qualify for construction and reconstruction funding under the forest highway program – which is administered by the Federal Highway Administration.

FSH 7709.59 Chapter 40 (2/09) – Highway Safety Programs as applied to all NFS roads. See Appendix 2 – HSA.

Forest Service Region 5 direction regarding MMU reiterates that roads maintained for passenger cars (ML 3 – 5) are highways and do meet the roughly graded exception defined in the CVC. Therefore, the operation of non highway legal vehicles on these roads must be consistent with state law for “combined use” and/or Forest Service MMU

policy. Further, Regional direction states that ATV operators must have state drivers' licenses to operate on these roads.

Methodology

Traffic Volume and Classification – The second task of the analysis is to learn the actual facts about how much volume and what class of vehicle is traveling on the Klamath NFS roads today.
See Appendix 3–Terms, for clarification of engineering terminology.

In the 1960s and 1970s the FS in California established a traffic surveillance program to assist in setting road construction design standards and cost share agreement percentages. Machine counts were the predominate method for obtaining data. Attempts were made to classify logging traffic from other traffic. The data and assumptions made during that period of time is what have generally been carried forward over the years.

Since the 1990's, the amount of road construction has been reduced to nearly nothing and the traffic surveillance program followed suit. As a result of the change in resource activities over the last 20 years the volume and class of traffic has changed dramatically and is not reflected in the data base (INFRA).

There is no recent statistically sound average daily traffic data or vehicle classification information available for the Klamath NF. The data in the transportation records generally reflects values used for design prior to the 1990's.

We know of one recent traffic volume and classification study done on 72 miles of NFS ML 3 and 4 roads by a State Licensed Traffic Engineer. The study protocol was fully documented and forwarded to the Washington Office Recreation Staff, National Visitor Use Monitoring Group, for evaluation and concurrence. The only change recommended was to observe and record the number of people in each vehicle when it passed the count station.

The protocol was based upon the guidance published in the ITTE Syllabus (Ref. 1) for rural roads. Manual counts were made between 7:00 AM and 7:00 PM on the first Sunday and third Wednesday in June, July and August, 2005. Recordings were by 4 hour blocks of time and distinguished between passenger cars, SUVs, pickups, highway legal motorcycles, dirt bikes and quads. No commercial traffic occurred during the summer on the involved roads. The protocol statistically measured 85% of total traffic flowing.

The observations were made by a group of volunteers under a Volunteer Agreement. The work began by holding a training session with all hands to ensure uniformity in data collection. The study included local USFS employee participation. This study provided a snapshot of what volume and class of traffic was flowing during the summer of 2005 on 72 miles of ML 3 and 4 NFS roads.

Table 1 – Statistical Sample – Summer 2005 Traffic Study on
72 miles Maintenance Level 3 and 4 unpaved NFS roads on the Lassen NF

Count Station Data	1	3	4	5	9	10	11	12	Ave
ADT–LNF Roads Analysis 2006	25	25	25	25	15	40	?	40	28
ADT Counted in 2005	5.5	18.0	19.2	11.2	5.6	13.9	14.0	7.9	12
Peak Hr (7/3)	5.0	13.8	5.8	3.3	2.3	3.0	8.5	1.5	5.4
Hwy Legal%*	42	95	83	87	83	76	95	85	81%
Non-Hwy Leg.%	58	5	17	13	17	24	5	15	19%
Passen. Car%	11	9	8	10	10	9	19	4	10%
People/veh	1.6	1.9	1.8	1.5	1.4	1.5	1.9	1.6	1.65

*Highway Legal – 10% pass. cars, 26% SUVs, 47% Pickups

$$\text{ADT} = \frac{\text{Average week end day (2)} + \text{Average week day (5)}}{7}$$

Peak Hour = chose 7/3 between 11AM and 3PM, thus data for 4 hours
Peak Hour = X ÷ 4

Finally – Keep in mind that the ADT volume is for a 24-hour day

So, how much traffic is flowing?

Count Station #1 Roads Analysis ADT = 25 ADT
25 ADT ÷ 24 Hours = 1.04 veh. per hour
Count Station #1 Observed ADT = 5.5 ADT
5.5 ADT ÷ 24 = 0.23 veh. per hour

The Klamath NF does not currently have an active traffic surveillance program. Therefore, judgments of engineering staff based on years of field observations have been used, guided by the above 2005 traffic study, to estimate the current volume and classification of traffic occurring on the NFS roads being evaluated in this analysis.

Appendix 4, lists Klamath NFS roads (or segments) with estimated ADT, estimated percentage of highway-legal and non-highway traffic flowing, average speeds and road widths. This estimate was prepared by the Forest Engineer, Transportation Planner and Roads Operation and Maintenance Engineer in March 2009.

Other Travel Factors – The third task is to assess other travel and roadway factors that may have an effect on the probability of a crash between highway-legal and non-highway-legal motor vehicles if they are permitted to co-exist on a road.

Speed – There is a design speed and there is an average speed that a prudent driver can travel the road under its current conditions. "The average speed method is a driving technique by which the driver is to travel at a speed that, in his/her opinion, is representative of the speed of all traffic at the time. Tests of this method have shown excellent correlation with actual travel time. (Ref. 1)

Road Surface – Surface conditions affect how fast a prudent driver can safely drive and stop. All roads in this study are unpaved, i.e., native, pit-run, rock aggregate or cinders. Stopping sight distances listed below are for these unpaved conditions and are compatible with guidance given in FSH 7709.56 4.25 (5/87).

Safe Stopping Sight Distance–Gravel Surface

MPH	Distance in Feet
10	70
15	120
20	150
25	190
30	215
35	280
40	290

Intersecting Roads/Trails – The key factor here is stopping sight distance for all operators. Normal conditions are that the main (major) road will have right-of-way and the operator making the turn movement has the greater responsibility. The physical "lay-of-the-land" and sight distance affect the judgment call to require traffic control at an intersection. The general rule on the Klamath NF is to not provide intersection controls where an unpaved road meets another unpaved road. There may be exceptions to this. When an unpaved road meets a paved road, then intersection control is generally required. Control is generally by use of a yield sign or stop sign.

Roadway Alignment, Visibility and Sight Distance – Can be measured by checking the stopping sight distance (see above).

Climate conditions – Not a major factor for the Klamath NFS roads. Mixed use generally occurs in the summer months when the weather is clear and warm. Drivers have the responsibility to slow down to avoid dust from other vehicles. In the fall, when rain is possible, you will see hunters out in pickups or quads. Quads are becoming the preferred method of poking around on the roads during the hunting season.

Single lane with turnouts – This is the general case for Klamath NFS roads. And those roads constructed via timber sales also have curve widening for log truck trailer tracking and an extra full lane width on curves to allow two logging/chip trucks to pass.

The typical design standards used during the development days were for a travel way width of 12 or 14 feet, plus 2-4 feet of curve widening on the inside of a curve and an

additional 10 foot wide passing zone/turnout on the outside of most curves. Turnouts were generally designed to be intervisible.

Most passenger cars, SUVs and pickups are about 7 feet wide. Most OHV's encountered are less than 50 inches wide–say 4 feet–thus there is room to safely pass.

An observation from driving these roads is that almost always opposing drivers slow down to pass, in particular the folks on quads. There is that 2-5% that does not drive safely and in particular those that are working out there. They are using the road to get to and from work and tend to over drive a safe speed, including USFS drivers.

Crash Probability – The following assumptions and benchmarks will be used to assess the risk of a crash happening: It is assumed that all operators have met California Vehicle Code requirements for having and maintaining their vehicle and have obtained required safety training and certifications to operate legally, that parents are responsibly looking after their minor operators, and all drivers are operating prudently.

Assessing High Probability and Low Probability for a crash:

Indicator	Benchmark Ranking	
	High	Low
Crash History (5 year period)	>4/site	0
Average Daily Traffic (ADT)	>150*	30 or less*
Prudent Driver Average Speed (MPH)	>40**	25 or less**
Intersections with Sight problems	>5	0
Visibility, Alignment, Stopping Sight Distance not met (sites) many	>10/mile	few <4/mile
Travel Way width (feet)	<10	14 or more

* Used by R3, & 6. R4 & R8 used 100 ADT or less for low probability
** In FSH 7709.55.32 (2/09)

Crash Severity –

1. Roadside Conditions

a. Downhill slopes – the steeper the slope the greater damage will be done in the event of a run off the road crash. A major portion of the Klamath NFS roads are in steep country. The operators know this and drive accordingly. The topography is visible. Also, FSH, 7709.59.41.4 (2/09) states that for NFS roads with an ADT of 400 or less, it is generally not appropriate to make special provisions for roadside design features, such as clear zones and barriers, intended to minimize the consequences of run off the road accidents.

b. Hazards – large, unyielding features adjacent to the road such as trees, bridge abutments, cattle guards, boulders, culvert drop inlets, drainage dips on curves, shoulder slough due to short culverts or grade lowering.

2. Speed – The road's surface condition plays a major part in how fast people will drive. Today, most travelers are out to enjoy the ride and road surfaces are rough, which keeps the speed down.

3. Traffic Class – A variety of different sized vehicles will tend to cause the severity to increase.

Assessing Crash Severity – The following assumptions and benchmarks will be used to assess the severity of a crash causing personal injury and property damage.

It is assumed that a temporary forest order will be issued for a road during times of commercial activity to prohibit non-highway-legal vehicles in accordance with FSH 7709.59.23 (2/09).

Proposed High Probability and Low Probability of a severe crash causing severe damage:

Indicator	Benchmark Ranking	
	High	Low
Prudent Driver Average Speed (MPH)	>40*	25 or less*
Clearance from Hazards	Little or None	Adequate
Alignment & Sight Distance	Poor	Adequate
Roadway Gradient	>12%	<12%
Multi-passenger vehicles	Buses	Cars, PU
	Motor homes	SUV

*In FSH 7709.55.32 (2/09)

Most operators on the Klamath NFS roads live in or very near the Forest and, therefore, are considered to be familiar with driving conditions. All operators are assumed to be legal per the license and safety certificate requirements of the state.

Crash History – There are no records or knowledge of mixed use crashes on ML 3-5 roads according to R5 mixed use accident data over the past 15 years. Reporting procedures are being established to provide information for future mixed use decision making, with emphasis on the official cause of the crash if roadway related.

Klamath NF Background

Transportation History – Homesteading and mining began in the 1800s, followed by logging, grazing and fire suppression. These activities generated the need for vehicle travel, thus the majority of roads that exist today were developed.

During the period of major timber harvesting, 1950s to 1980s, roads were designed and constructed to serve the efficient extraction of timber. The roads also provided access for all forms of recreation, including driving for pleasure. The designs were done to accommodate the large logging trucks and the volume of daily traffic that was generated. The roads were generally 12-14 feet wide with intervisible turnouts so that logging trucks could pass each other. Further, the Region had a traffic surveillance (counting) program to understand how much traffic was actually flowing, when and where. The ADT data that is in the INFRA corporate database today is based largely upon the data collected in the 1970s and '80s and needs to be revised.

With the major change in resource activities in the 1990s, traffic flow on the NFS roads has changed significantly. Funding for the operation and maintenance of the existing system has also been reduced. As a result, factual knowledge of the type and volume of traffic has not been updated or collected. Instead, emphasis has been given to drainage maintenance and higher clearance vehicle access.

Mixed Use Traffic and Public Safety: The Klamath has a long history of light density MMU with no recorded accidents resulting from the interaction of highway and non highway legal vehicles. Our non highway legal vehicle user groups are predominately local residents that use utility type ATV's that are built for power rather than speed. They typically ride our road system to hunt or sight see rather than race as you may see on forests near large urban centers.

The landscape is rugged, particularly on the west side of Interstate Highway 5, and this affords many excellent observation points to enjoy the scenery. Because the existing roads were constructed for logging, they are fairly wide and have reasonable stopping sight distance and intervisible turnouts. Furthermore, the roadway surface has worn down to where it is impractical to maintain the surface in a smooth condition, thus travel speeds are generally slow, between 10 and 20 miles per hour.

User safety is further enhanced by the fact that the recent estimated traffic volume on any given road is in the range of less than 1 to at most 15 vehicles per day. At 15 vehicles in a 15 hour driving day, statistically that is one vehicle every 1 hour.

Consistency with State and Local Law – During public workshops on Travel Management recently held throughout Siskiyou County, it became apparent that many OHV users were not aware of 1) the difference between ML 2, ML 3 and some ML 4 roads, 2) the Forest Service interpretation of the CVC regarding ML 3 roads as highways and 3) the associated vehicle restrictions. Their frame of reference is

focused on the road surface - whether the road is paved or gravel/dirt. OHV users agreed that paved roads were not open to OHV's, but thought unpaved roads were legal to use. Together with observations by Forest Service employees, it is clear that OHV use is occurring on ML3 and ML 4 roads, not because it is sanctioned by the Forest Service, but rather public misperception and historical practices on a large remote road system. An important aspect of implementing any alternative and publishing the Motor Vehicle Use Map will be educating the public on when and where use of non-highway legal vehicles is allowed.

Regional Forester Order No. 08-01 pertaining to Division 16.5 of the California Vehicle Code provides the authority for NF Law Enforcement Officer's to contact operators and check for safety certificates as well as registrations, helmets, spark arresters, brakes and to provide information and education.

Summary

The background presented above provides the context used for assessing the safety of motorized mixed use on the individual roads in this analysis.

References

1. Fundamentals of Traffic Engineering – 6th Edition – Syllabus, Institute of Transportation and Traffic Engineering (ITTE), University of California, Berkeley, CA 1966.

2. Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), Federal Highway Administration (FHWA), 2003 Edition.

3. Guide for Traffic Volume Counting Manual, Bureau of Public Roads (now FHWA), 2nd Edition, 1965.

4. Forest Service Manual and Handbook (FSM 7700 & FSH 7709.59)

Attachment 1 – CVC

California Vehicle Code (CVC) Liability and Licensing Requirement

Following are brief excerpts from the on-line code:

Division 6 – Driver's Licenses (Highway Legal)

CVC 12500. (a) A person may not drive a motor vehicle upon a highway, unless the person then holds a valid driver's license under this code.

CVC 12501. The following persons are not required to obtain a driver's license:
(c) Any person driving or operating an off-highway motor vehicle subject to identification, as defined in Section 38012, while driving or operating such motor vehicle as provided in Section 38025.

38012 – Motorcycle or motor driven cycle, snowmobile, sand buggy, dune buggy, all-terrain vehicle or Jeep. (green or red sticker)

38025 – to cross a two-lane highway.

CVC 12512. Except as provided in Sections 12513, 12514 and 12814.6, no license to drive shall be issued to a person under the age of 18 years.

12513 – Junior permit for 14-18 when for school purpose or public transportation more than one mile away.

12514 – Junior permit duration

12814.6 – Provisional license for minor under direct supervision of 25 year old licensed driver or parent.

Class M1 Licenses. To operate any 2-wheel motorcycle or motor driven cycle.

NOTE – The DMV will not issue a license to operate a 2-wheel motorized vehicle to anyone under 21 years of age unless that person has completed a CHP approved motorcycle rider training program certified on the Certificate of Completion of Motorcycle Trailing (DL 389).

OHV – See Division 16.5 Chapter 7 below. (Non-Highway-Legal)

Division 7 – Financial Responsibility Laws

Reportable Off-Highway Accident

16000.0 (a) For purposes of this division, a "reportable off-highway accident" means an accident which includes all of the following:

(1) Occurs off the street or highway.

(2) Involves a vehicle that is subject to registration under this code.

(3) Results in damages to the property of any one person in excess of seven hundred fifty dollars ($750) or in bodily injury or in the death of any person.

(b) A "reportable off-highway accident" does not include any accident which occurs off-highway in which damage occurs only to the property of the driver or owner of the motor vehicle and no bodily injury or death of a person occurs.

Evidence of Financial Responsibility

CVC 16020. (a) Every driver and every operator of a motor vehicle shall at all times be able to establish financial responsibility pursuant to Section 16021, and shall at all times carry in the vehicle evidence of the form of financial responsibility in effect for the vehicle.

Establishing Financial Responsibility

CVC 16021. Financial responsibility of the driver or owner is established if the driver or owner of the vehicle involved in an accident described in Section 16000 is:

b) An insured or obligee under a form of insurance or bond which complies with the requirements of this division and which covers the driver for the vehicle involved in the accident.

Division 9 – Civil Liability of Owners and Operators of Vehicles

Article 2. Liability of Private Owners

17150. Every owner of a motor vehicle is liable and responsible for death or injury to person or property resulting from a negligent or wrongful act or omission in the operation of the motor vehicle, in the business of the owner or otherwise, by any person using or operating the same with the permission, express or implied, of the owner.

Division 16.5 Off-Highway Vehicles

Vehicle License

CVC 38012. (a) As used in this division, "off-highway motor vehicle subject to identification"* means a motor vehicle subject to the provisions of subdivision (a) of Section 38010.

(b) As used in this division, "off-highway motor vehicle" includes, but is not limited to, the following:

(1) Any motorcycle or motor-driver cycle, except for any motorcycle which is eligible for a special transportation identification device issued pursuant to Section 38088. (Motorcycle used in racing events).

(2) Any snowmobile or other vehicle designed to travel over snow or ice, as defined in Section 557.

(3) Any motor vehicle commonly referred to as a sand buggy, dune buggy, or all-terrain vehicle.

(4) Any motor vehicle commonly referred to as a jeep (that is not highway legal).

*Identification refers to registration with DMV and evidenced by a green or red sticker–date sensitive.

Vehicle Equipment

CVC 38335 & 38345 – Headlights and taillights when operating from one-half hour after sunset to one-half hour before sunrise.

CVC 38355 – Serviceable brakes.

CVC 38366 – Spark Arrester

CVC 38370 – Noise Limits

Division 16.5 Chapter 7 OHV Safety, education and certificates

CVC 38007. The Off-Highway Motor Vehicle Recreation Division of the Department of Parks and Recreation shall adopt courses of instruction in off-highway motor vehicle safety, operation, and principles of environmental preservation by January 1, 2005. For this purpose the division shall consult with the Department of the California Highway Patrol and other public and private agencies or organizations. The division shall make this course of instruction available directly, through contractual agreement, or through volunteers authorized by the division to conduct a course of instruction.

CVC 38501. (a) An all-terrain vehicle safety training organization, commencing on January 1, 1989, shall issue an all-terrain vehicle safety certificate furnished by the department to any individual who successfully completes a course of instruction in all-terrain vehicle operation and safety as approved and certified by the Off-highway Vehicle Safety Education Committee.

CVC 38502. The department, on and after July 1, 1988, may monitor any all-terrain vehicle safety training organization or any all-terrain vehicle safety instructor without advance notice. The monitoring may include, but is not limited to, the instruction provided, business practices, and records required by Section 11108.

CVC 38503. No person under the age of 18 years, on and after January 1, 1990, shall operate an all-terrain vehicle on public lands of this state unless the person satisfies one of the following conditions:

(a) The person is taking a prescribed safety training course under the direct supervision of a certified all-terrain vehicle safety instructor.
(b) The person is under the direct supervision of an adult who has in their possession an appropriate safety certificate issued by this state, or issued under the authority of another state.

(c) The person has in possession an appropriate safety certificate issued by this state or issued under the authority of another state.

CVC 38504. No person under 14 years of age, on and after January 1, 1990, shall operate an all-terrain vehicle on public lands of this state unless the person satisfies one of the conditions set forth in Section 38503 and, in addition, is accompanied by and under the direct supervision of a parent or guardian or is accompanied by and under the direct supervision of an adult who is authorized by the parent or guardian.

CVC 38504.1 (a). Neither a parent or guardian of a child who is under 14 years of age, nor an adult who is authorized by the parent or guardian to supervise that child shall grant permission to, or knowingly allow, that child to operate an all-terrain vehicle in a manner that violates Section 38504.

CVC 38504.2. If a person under 14 years of age was not properly supervised or accompanied in accordance with Section 38504, and the parent or guardian of that child or the adult who was authorized by the parent or guardian to supervise or accompany that child is in violation of Section 38504.1, upon conviction pursuant to Section 38504, the court may order that child to attend and complete the all-terrain vehicle safety training course accompanied by the person who violated Section 38504.1. If so ordered, the child under 14 years of age shall provide the court a copy of the all-terrain vehicles safety certificate issued as a result of that completion.

CVC 38505. No person, on and after January 1, 1989, shall operate, ride, or be otherwise propelled on an all-terrain vehicle on public lands unless the person wears a safety helmet meeting requirements established for motorcycles and motorized bicycles, pursuant to Section 27802.

CVC 38305. 38314, 38316a, 38317. Operators may not drive a motor vehicle in a manner that endangers the safety of other persons or their property.

CVC 38319. No person shall operate, nor shall an owner permit the operation of, an off-highway motor vehicle in a manner likely to cause malicious or unnecessary damage to the land, wildlife, and wildlife habitat or vegetation resources.

Attachment 2 – HSA

Highway Safety Program – FSH 7709.59.40 (2/09)

40.3 – Policy

- Safety is the predominant consideration in road operation and maintenance and takes priority over biological and other considerations.
- Roadways must be managed for safe passage by road users.
- Identification of danger trees must be performed by qualified persons.
- When high priority hazards to road users are identified on NFS roads and those hazards cannot be immediately mitigated, the roads must be closed.

41 – Highway Safety Program Components

41.1 – Traffic Engineering Services

1. Engineering skills
2. Engineering principles and road safety audits
3. Establish a traffic control device plan

41.2 – Identification, Investigation, and Surveillance of Accident (Crash) Locations

41.3 – Design and Construction

1. Design Standards – for construction and reconstruction of NFS roads
2. Temporary Traffic Control at Construction Sites – requires compliance with MUTCD in construction zones on roads open to public travel.

41.4 – Roadside Design

On NFS roads with 400 ADT or less, it is generally not appropriate to make special provision for roadside design features, such as clear zones and barriers, intended to minimize the consequences of run off the road accidents.

41.5 – Highway–Rail Grade Crossings

Sign all railroad grade crossings in accordance with the MUTCD

41.6 – Roadway Maintenance

Maintain roadway and roadsides for movement of traffic commensurate with the annual operational maintenance level assigned to the road.

41.7 – Hazard Identification and Correction

1. General – use common sense and engineering judgment to determine safety deficiencies and the priority for corrective action.

2. Danger Trees

41.8 – Incident Management

Temporary traffic control measures during incident management activities must comply with the MUTCD, Part 6.

41.9 – Forest Service Employees and Forest Service-Owned Equipment.

Requirements are found in FSH 6709.11 Health and Safety Code Handbook, Chapter 10 and the Drivers-Operators Guide, EM-7130-2.

Attachment 3 – Terms

Clarification of Terms

Combined Use – This is a State of California term defined in CVC 38026 to provide for OHV's to legally use up to 3 miles of highway. The California Highway Patrol has clarified, via their December 19, 2007 letter to the Regional Forester of the Pacific Southwest Region (California) of the U. S. Forest Service, that unpaved USFS roads are not considered highways.

Mixed Use – This is a U.S. Forest Service term most recently defined in their "Guidelines for Engineering Analysis of Motorized Mixed Use on National Forest System Roads" (EM-7700-30, December 2005). The Guide's Glossary, page 10, defines Motorized Mixed Use as "Designation of a NFS road for use by both highway-legal and non-highway legal motor vehicles".

Shared Use – This is a term and standard warning sign listed in the 2003 edition of the "Manual of Uniform Traffic Control Devices" published by the Federal Highway Administration.

CalTrans and other road management agencies, including the Forest Service, may use these signs to warn the traveling public about what they may encounter along the highway or road where posted. This sign does serve to put the traveling public on notice that they may encounter a bicycle, horse, ATV, etc.

The terms traffic volume, traffic flow, average daily traffic (ADT), and vehicle classification are used throughout the FSM and FSH directives and guidance, but they are not defined.

The following are definitions for the above terms and some others as used in this analysis:

Average Day – a day representing traffic volumes normally and repeatedly found at a location. When volumes are primarily influenced by employment, the average day is typically a week day. When volumes are primarily influenced by entertainment or recreation, the average day is typically a weekend day. (Ref. 2)

Average Daily Traffic (ADT) – the average number of vehicles passing a particular point on the road during a specified period of time. (Ref. 3)

Average daily traffic is calculated by averaging the recorded weekday and weekend day traffic for the time period. (Ref. 3)

Average Daily Traffic (ADT) or Average Annual Daily Traffic (AADT) in vehicles per day is used for: (Ref 1)
a) Measuring the present demand for service by the road.
b) Evaluating the present traffic flow with respect to the road system.
c) Developing (or identifying) the major or arterial road system.
d) Locating areas where new facilities or improvements to existing facilities are needed.

Counting Periods – The length of time that a specific location should be counted is dependent upon the data desired and the application in which the data are to be used. (Ref. 1)

1. Some of the more commonly used intervals are:
    a. Weekends between 6PM Friday to 6AM Monday
    b. 24–hour counts
    c. 16–hour counts usually from 6AM to 10PM
    d. 12–hour counts usually from 7AM to 7PM to cover most daytime traffic movements.
    e. Peak-period counts, i.e., commute times

Counting Programs – The establishment of scheduled periodic volume counts is necessary if accurate information concerning the use of roads is to be maintained. (Ref. 1)

1. Rural Counting Programs
2. Urban Count Programs
3. California Statewide Counting Program

Counting Techniques – The data required usually determines the method to be used in obtaining the counts. (Ref. 1)

1. Machine Counts
2. Manual Counts
3. Moving Vehicle Method

Traffic – pedestrians, bicyclists, ridden or herded animals, vehicles, streetcars, and other conveyances either singularly or together while using any highway for purposes of travel. (Ref. 2)

Traffic Counter – a person or a machine that keeps track of the traffic that passes a counting site in a specified period of time.

Traffic Service Level – A description of the road's significant traffic characteristics and operating conditions:

Code	Description
A –	Free flowing, mixed traffic; stable, smooth surface. Provides safe service to all traffic.
B –	Congested during heavy traffic, slower speeds and periodic dust; accommodates any legal-size load or vehicle.
C –	Interrupted traffic flow, limited passing facilities, may not accommodate some vehicles. Low design speeds. Unstable surface under certain traffic or weather.
D –	Traffic flow is slow and may be blocked by management activities. Two-way traffic is difficult, backing may be required. Rough and irregular surface. Travel with low clearance vehicles is difficult. Single purpose facility.

Volume Studies – The type of data collected in a specific volume study depends upon the application in which the information is to be used. (Ref. 1)

1. Street (Road) Counts
2. Direction Counts
3. Turning Movement/Intersection Counts
4. Classification Counts
5. Occupancy Counts

Volume Characteristics – Traffic volumes tend to have general characteristics depending upon certain variables present. (Ref. 1)

1. Variables
    a) Type of road – Rural or Urban
    b) Type of use – recreational, commercial
    c) Composition of traffic – proportion autos, pickups, buses, or (OHV)
2. Rural Characteristics
    a) A recreational route with high summer traffic and a high Sunday peak.
    b) A general purpose interstate route
    c) A farm service route

Attachment 4 – Current Traffic Volume and Classification Estimates

District	Road Number	INFRA ADT	Est. ADT	Ave Speed	Rd Width
51	12	20/5/10	10	20	22
51	46N42	5	5	20	20
51	46N50	5	10	18	17
52	15N19	20	5	15	16
52	45N19	10/20	5	14	16
52	46N03	30	5	20	18
54	39	5	5	20	18
54	39N23	5	10	15	18
54	39N41	5	10	15	18
54	39N60	1	10	15	17
55	40N08	1/5/5	5	20	18
55	41N08	10	10	25	18
57	6	25	10	20	17
57	43N69	10/25	5	10	16
57	46N09	25	15	15	17
58	13N11	10/30	5	15	16
58	14N01	30	5	20	16
58	15N17	10/30	5	15	16

The collaborative judgment of the Forest Engineering Staff is that the general traffic on the Klamath is made up of 90% high-clearance vehicles, 2% passenger cars, 6% quads and 2% dirt bikes. OHV use has been observed over time on all of these roads. These percentages do not reflect sporadic commercial use of the road.

The average speed listed is the speed recorded when driving the road now. And the road widths listed represent the measured width over most of the road's length. There are minor variations of these numbers; however, they are evident when driving the road.

Attachment 5 - Documentation of Engineering Judgment: Analysis of Roads For Motorized Mixed Use Designation

Forest: Klamath District: 51 Oak Knoll

The following roads or segments are included in this engineering judgment:

Road Name	Road No	BMP	EMP	Ob ML	Op ML	Maint. by	Jurisd.
Siskiyou Divide	20	0.35	13.44	3	3	FS	FS
Siskiyou Summit	40S01	0.00	9.54	3	3	FS	FS
Beaver Grouse	40S15	3.40	9.80	3	3	FS	FS
Long John	40S16	0.00	7.23	3	3	FS	FS
High CCC	45N28	19.98	21.49	2	3	FS	FS
White Cloud	47N69	0.00	4.17	3	3	FS	FS

The Forest Engineer, Transportation Planner and Roads Operations and Maintenance Engineer collaborated their judgment to assign traffic volume and vehicle classification. The collective judgment is that traffic flow ranges between 5 ADT and 15 ADT and composition is approximately 90% high-clearance vehicles, 2% passenger cars, and 8% OHV's at this time.

All of the roads listed above were constructed more than 20 years ago with the main reason for level 3 status being high volume commercial haul. The only maintenance required in recent years has been culvert cleaning, tree or rock hazard removal and brushing if required for intermittent commercial use. The existing running surface is hard, stable and generally weather resistant. Grading is typically not needed for resource protection and would actually be counterproductive due to the existing hard and/or stable surface. The roads or road segments located in California specifically meet the CVC 38001 exemption for non-highway legal vehicles in two ways. First, they began existence as logging roads and second, are considered roughly graded today, i.e., rough with lots of embedded rocks showing. The road or road segments located in Oregon meet the exemptions listed in ORS 821.020.

All of these roads have had some OHV (green sticker) vehicle use over the years and there are no records or knowledge of crashes between highway-legal and non-highway-legal motor vehicles. Therefore, per FSH 7709.55.30.3 (1/09) No. 5, all of these roads are recommended for mixed use and reducing the operational maintenance level to 2.

Prepared by: _____ Date: _____
Lampe Engineering

Approved by: _____ Date: _____
Qualified Engineer

Forest: Klamath District: 52 Happy Camp

The following roads or segments are included in this engineering judgment:

Road Name	Road No	BMP	EMP	Ob ML	Op ML	Maint. by	Jurisd.
Bishop	15N13	9.95	13.04	3	3	FS	FS
Doolittle	17N11	2.3	9.9	3	3	FS	FS
Benjamin Creek	17N16	0.0	16.56	3	3	FS	FS
Fryingpan Ridge	45N85	0.0	4.44	2	3	FS	FS

The Forest Engineer, Transportation Planner and Roads Operations and Maintenance Engineer collaborated their judgment to assign traffic volume and vehicle classification. The collective judgment is that traffic flow ranges between 5 ADT and 15 ADT and composition is approximately 90% high-clearance vehicles, 2% passenger cars, and 8% OHV's at this time.

All of the roads listed above were constructed more than 20 years ago with the main reason for level 3 status being high volume commercial haul. The only maintenance required in recent years has been culvert cleaning, tree or rock hazard removal and brushing if required for intermittent commercial use. The existing running surface is hard, stable and generally weather resistant. Grading is typically not needed for resource protection and would actually be counterproductive due to the existing hard and/or stable surface. The roads or road segments located in California specifically meet the CVC 38001 exemption for non-highway legal vehicles in two ways. First, they began existence as logging roads and second, are considered roughly graded today, i.e., rough with lots of embedded rocks showing.

All of these roads have had some OHV (green sticker) vehicle use over the years and there are no records or knowledge of crashes between highway-legal and non-highway-legal motor vehicles. Therefore, per FSH 7709.55.30.3 (1/09) No. 5, all of these roads are recommended for mixed use and reducing the operational maintenance level to 2.

Prepared by: _____ Date: _____
Lampe Engineering

Approved by: _____ Date: _____
Qualified Engineer

Forest: Klamath District: 54 Salmon River

The following roads or segments are included in this engineering judgment:

Road Name	Road No	BMP	EMP	Ob ML	Op ML	Maint. by	Jurisd.
High Point	10N04	0.00	18.69	3	3	FS	FS
Cecil Point	38N27	0.15	10.01	3/2	3	FS	C/FS

The Forest Engineer, Transportation Planner and Roads Operations and Maintenance Engineer collaborated their judgment to assign traffic volume and vehicle classification. The collective judgment is that traffic flow ranges between 5 ADT and 15 ADT and composition is approximately 90% high-clearance vehicles, 2% passenger cars, and 8% OHV's at this time.

All of the roads listed above were constructed more than 20 years ago with the main reason for level 3 status being high volume commercial haul. The only maintenance required in recent years has been culvert cleaning, tree or rock hazard removal and brushing if required for intermittent commercial use. The existing running surface is hard, stable and generally weather resistant. Grading is typically not needed for resource protection and would actually be counterproductive due to the existing hard and/or stable surface. The roads or road segments located in California specifically meet the CVC 38001 exemption for non-highway legal vehicles in two ways. First, they began existence as logging roads and second, are considered roughly graded today, i.e., rough with lots of embedded rocks showing.

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Prepared by: _____ Date: _____
Lampe Engineering

Approved by: _____ Date: _____
Qualified Engineer

Forest: Klamath District: 55 Scott River

The following roads or segments are included in this engineering judgment:

Road Name	Road No	BMP	EMP	Ob ML	Op ML	Maint. by	Jurisd.
Tom Walker	46N64	24.12	30.78	3	3	FS	FS

The Forest Engineer, Transportation Planner and Roads Operations and Maintenance Engineer collaborated their judgment to assign traffic volume and vehicle classification. The collective judgment is that traffic flow ranges between 5 ADT and 15 ADT and composition is approximately 90% high-clearance vehicles, 2% passenger cars, and 8% OHV's at this time.

All of the roads listed above were constructed more than 20 years ago with the main reason for level 3 status being high volume commercial haul. The only maintenance required in recent years has been culvert cleaning, tree or rock hazard removal and brushing if required for intermittent commercial use. The existing running surface is hard, stable and generally weather resistant. Grading is typically not needed for resource protection and would actually be counterproductive due to the existing hard and/or stable surface. The roads or road segments located in California specifically meet the CVC 38001 exemption for non-highway legal vehicles in two ways. First, they began existence as logging roads and second, are considered roughly graded today, i.e., rough with lots of embedded rocks showing.

All of these roads have had some OHV (green sticker) vehicle use over the years and there are no records or knowledge of crashes between highway-legal and non-highway-legal motor vehicles. Therefore, per FSH 7709.55.30.3 (1/09) No. 5, all of these roads are recommended for mixed use and reducing the operational maintenance level to 2.

Prepared by: _____ Date: _____
Lampe Engineering

Approved by: _____ Date: _____
Qualified Engineer

Forest: Klamath District: 57 Goosenest

The following roads or segments are included in this engineering judgment:

Road Name	Road No	BMP	EMP	Ob ML	Op ML	Maint. by	Jurisd.
Baird Spring	43N02	1.83	3.73	2	3	FS	FS
Little Horse	43N03	2.22	4.36	2	3	FS	FS
Lost Springs	43N37	0.00	0.71	3	3	FS	FS
South Deer Tie	43N69	0.00 4.42	1.50 5.60	2	3	FS	FS
Badger Loop	44N03	0.00	8.82	3	3	FS	FS
Deer Mtn	44N23	7.94	12.87	3	3	FS	FS
Old Highway	44N25	1.59 4.90	1.90 5.30	3	3	FS	FS
Cold Bottle Spring	46N09	0.00	2.12	3	3	FS	FS
Poison Springs	47N05	2.80	5.14	3	3	FS	FS
Steep Trail	47N13	0.00	8.90	3	3	FS	FS

The Forest Engineer, Transportation Planner and Roads Operations and Maintenance Engineer collaborated their judgment to assign traffic volume and vehicle classification. The collective judgment is that traffic flow ranges between 5 ADT and 15 ADT and composition is approximately 90% high-clearance vehicles, 2% passenger cars, and 8% OHV's at this time.

All of the roads listed above were constructed more than 20 years ago with the main reason for level 3 status being high volume commercial haul. The only maintenance required in recent years has been culvert cleaning, tree or rock hazard removal and brushing if required for intermittent commercial use. The existing running surface is hard, stable and generally weather resistant. Grading is typically not needed for resource protection and would actually be counterproductive due to the existing hard and/or stable surface. The roads or road segments located in California specifically meet the CVC 38001 exemption for non-highway legal vehicles in two ways. First, they began existence as logging roads and second, are considered roughly graded today, i.e., rough with lots of embedded rocks showing.

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Prepared by: _____ Date:
Lampe Engineering

Approved by: _____ Date:
Qualified Engineer